

Isolation of power supplies

Guidance Note 14

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Legal Obligations

The Health and Safety at Work Act 1974 sets out the general health and safety duties of employers, employees and the self-employed.

The Electricity at Work Regulations 1989, require precautions to be taken against the risk of death or personal injury from electricity during work activities. To comply with these Regulations, the normal working method of carrying out work on electrical equipment or circuits should be with the system powered down and isolated (known as dead working). Live working should only be carried out in particular circumstances where it is unreasonable to work dead, such as fault finding and testing, where the risks are acceptable, and where suitable precautions can be taken against injury.

The Provision of Work Equipment Regulations (PUWER) also require that every employer shall take appropriate measures to ensure that re-connection of any energy source to work equipment does not expose any person using the work equipment to any risk to his health or safety.

Therefore the employer is responsible for ensuring that any employee, using or maintaining work equipment does not expose these workers to harm. This is of particular relevance whilst carrying out maintenance of work equipment, where the likelihood of staff being exposed to mechanical or electrical hazards is significantly greater than usual.

All personnel involved in the isolation of plant and equipment should be trained and competent to carry out their responsibilities and understand the purpose, principles and practices of safe isolation procedures and safety rules.

What is Isolation?

Isolation means establishing a break in the energy supply in a secure manner, e.g. by ensuring that inadvertent reconnection is not possible. It may be necessary to also consider multiple energy sources, which may include electricity, pressure (hydraulic or pneumatic), or heat. Where appropriate, a safe method of dissipating stored energy (such as capacitors) should be considered.

The key principle of isolation is that the point of isolation should be under the control of the person who is carrying out the work on the isolated equipment.

Electrical isolation

For low voltage systems (up to 1000 v ac) the means of isolation could be an adjacent local isolation device such as a plug and socket, switch-disconnector, circuit breaker or fuse etc., as appropriate, which is under the direct control of the competent person carrying out the work. These methods can be used without further precautions provided there is no foreseeable risk that the supply could be reinstated by others.

When there is no local means of isolation, or the point of isolation is not under the direct control of the competent person carrying out the work, or where there is a risk of inadvertent reinstatement of the supply by other workers, the circuit or equipment to be worked on should be securely isolated.

Securing the point of isolation should be by a combination of the following methods;

- A padlock with unique key or combination
- A locked switch-room door or locked distribution box (DB)
- Circuit breakers should be locked-off using an appropriate locking-off clip with a padlock
- Removal of the relevant circuit fuse (may be used with a lockable fuse insert and padlock)

The above padlocks keys or combinations and removed fuses should be retained by the competent person carrying out the work.

Note The practice of putting insulating tape over a circuit breaker to prevent accidental switch on, is **NOT** a safe isolation procedure.

Where more than one person will be working on equipment, the use of a multi-lock hasp can be used to prevent access to a main isolator until such time that all persons working on a system have completed their work and removed their padlocks from the hasp.

In all instances where there is a risk that the supply could be inadvertently reinstated, an appropriate notice should be placed at the point of isolation e.g. "Caution Do Not Switch On, System Undergoing Maintenance".



Figure 1: A selection of padlocks and Hasp.

Proving the isolated equipment or circuit is dead

Following isolation of equipment or circuits and prior to starting work you should prove that the parts to be worked on are dead. It must never be assumed that equipment is dead because a particular isolation device has been placed in the off position. The test instrument should be proved to be working on a known live source or proprietary proving unit before and after use. All phases of the supply and the neutral should be tested and proved dead.

Care must always be taken to ensure all supplies to the equipment are isolated, some equipment may have additional supplies under certain conditions e.g. photo electric sensors which will only switch during the hours of darkness, therefore if the proving dead check was carried out during the day, the equipment may become live in the evening.

Mechanical and other Isolation Procedures

Where a machine or device is connected to a piping system e.g. hydraulic, pneumatic or where piping may introduce hazardous products during the repair process, the piping shall be disconnected, or disabled using a suitable device such as blanking plates. If possible the supply valve must be closed and locked out prior to work commencing. Valves should be locked with a padlock (and chain if required). If the valve cannot be locked off then the valve handle may be removed and retained by the person carrying out the maintenance.

Blocking and/or restraints such as chocks or locking pins should be put into place to prevent any parts from moving during repairs. Residual or stored energy must be relieved or restrained prior to repair work commencing, this may include relaxing any springs, relieving any pressure or vacuum.

The final step should be to attempt to re-start or re-energize the equipment or machinery to verify an isolated condition. If the equipment does not re-start, then work can proceed.

Note NEVER rely on an interlock device to adequately isolate equipment.

Further guidance

- Safe use of work equipment
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HSG 85
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- Guidance on safe isolation procedures for low voltage installations
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